

The first record of *Dimargaris bacillispora* (*Dimargaritales*) in South America

ANDRÉ LUIZ CABRAL M. DE A. SANTIAGO¹,
MARIA A. Q. CAVALCANTI¹ & SANDRA FARTO BOTELHO TRUFEM²

andrelcabral@msn.com, xiliamac@terra.com.br, strufem@cy.com.br

¹*Programa de Pós-graduação em Biologia de Fungos. Universidade Federal de Pernambuco. Av. Prof. Nelson Chaves, s/n, 50670-420, Recife, PE, Brasil*

²*Universidade São Marcus
Rua Antônio Gomes Ferreira 89, 04257-100, São Paulo, SP, Brasil*

Abstract – *Dimargaris bacillispora* was reported for the first time in South America from tapir (*Tapirus terrestris*) dung collected at the Reserva Ecológica de Dois Irmãos (8°7'30" S and 34°52'30" W), located in Recife, State of Pernambuco, Northeast Brazil.

Key Words – Zygomycetes, Dimargaritaceae, herbivore, taxonomy

Introduction

The first report of *Dimargaris* was provided by Tieghem (1875), who introduced the genus and described *Dimargaris cristalligena* from rat dung in Paris, France. Subsequently, valuable contributions were provided by Benjamin (1959, 1965), Mehrotra & Baijal (1963, 1964), Boedijn (1959), Mikawa (1976), Mirza et al. (1979), Kirk & Kirk (1984) and Wrzosek & Gajowniczek (1998). Currently, *D. arida*, *D. bacillispora*, *D. cristalligena*, *D. oblongispora*, *D. simplex*, *D. verticillata* and *D. xerosporica* are recognized in the genus (Benny 2005).

Dimargaris bacillispora was first described by Benjamin (1959) from mouse dung in California (USA). Since then only a few records of this species have been published. *Dimargaris bacillispora* is a parasite of *Mortierellales* and *Mucorales* (Benny 2005), as the other species of the genus.

The aim of this report is the description of *D. bacillispora* from tapir dung in Brazil.

Materials and methods

Samples of tapir (*Tapirus terrestris* L.) dung were collected at the Reserva Ecológica de Dois Irmãos (8°7'30"S and 34°52'30"W), which includes a

Zoological Park, located in Recife, State of Pernambuco, Northeast of Brazil. The area is 387 ha and comprises an Atlantic Forest Ecological Reserve. The samples were collected with a sterilized spatula, placed in plastic bags, taken to the laboratory and incubated in a moist chamber at $28^{\circ}\text{C} \pm 2^{\circ}\text{C}$ for 7 days under alternating light and dark periods. The specimen was studied directly from the substrata under a stereomicroscope and a light microscope and described according to Benjamin (1959). A slide is deposited in the Pe. Camille Torrend (URM) Herbarium of the Universidade Federal de Pernambuco, Recife, Brazil.

Taxonomy

Dimargaris bacillispora R.K. Benj., Aliso 4: 376 (1959)

FIG. 1 A–D

MATERIAL EXAMINED: Brazil, Pernambuco, Recife, Reserva Ecológica de Dois Irmãos, May/06, A. L. C. M. A. Santiago (URM 80036/46015).

SPOROPHORES erect, colorless, 1–3 mm long, with simple branches, that become irregularly verticillate, bearing fertile heads terminally. SEPTUM with a lenticular cavity. FERTILE BRANCHES $50\text{--}400 \times 6.5\text{--}12 \mu\text{m}$, formed below each of the distal septa of the main stalks and producing one or two secondary branches. DISTAL CELLS of the main stalks about $100\text{--}200 \mu\text{m}$ long. BASAL CELLS of the main stalks $7.5\text{--}13 \mu\text{m}$ wide. FERTILE HEADS $30\text{--}60 \mu\text{m}$ diam, composed of four divergent sporiferous branchlets bearing cells formed successively by budding. BASAL CELLS $10\text{--}18 \times 7.5\text{--}10 \mu\text{m}$; cells of the primary branches producing 1–3 divergent cells which may form new cells that produce merosporangia or give rise to merosporangia. All cells of sporiferous heads, except a few of the proximal cells of the primary and secondary branches, disarticulating at maturity and the spores, immersed in drops of liquid which form glistening white spheres about $22\text{--}45 \mu\text{m}$ diam. MEROSPORANGIA cylindrical, simultaneously forming two bacilliform slightly curved MEROSPORES, $5\text{--}6(-7.5) \times 1.5\text{--}2.5 \mu\text{m}$, with a globule at each end. ZYGOSPORES not observed.

HABITAT: Parasitizing *Mucor* sp. growing on tapir dung.

DISTRIBUTION: Brazil, Mexico, Pakistan, USA (California, Florida, Arizona).

NOTES: The characteristics of this strain of *D. bacillispora* showed a close similarity with the description of Benjamin (1959), except for the merospores, which have a globule at each end. However, we do not consider this difference enough to characterize a new variety.

Mehrotra & Baijal (1963) reported an isolate of *Dimargaris* from cow dung in Allahabad, India and named it *D. oblongispora*. According to these authors, this species is closely related to *D. bacillispora* and differs in producing oblong merospores and sporangiophores with septate branches. However, according to Kirk & Kirk (1984), this isolate from India does not appear, from the published description and illustrations, to be significantly different from *D. bacillispora*,

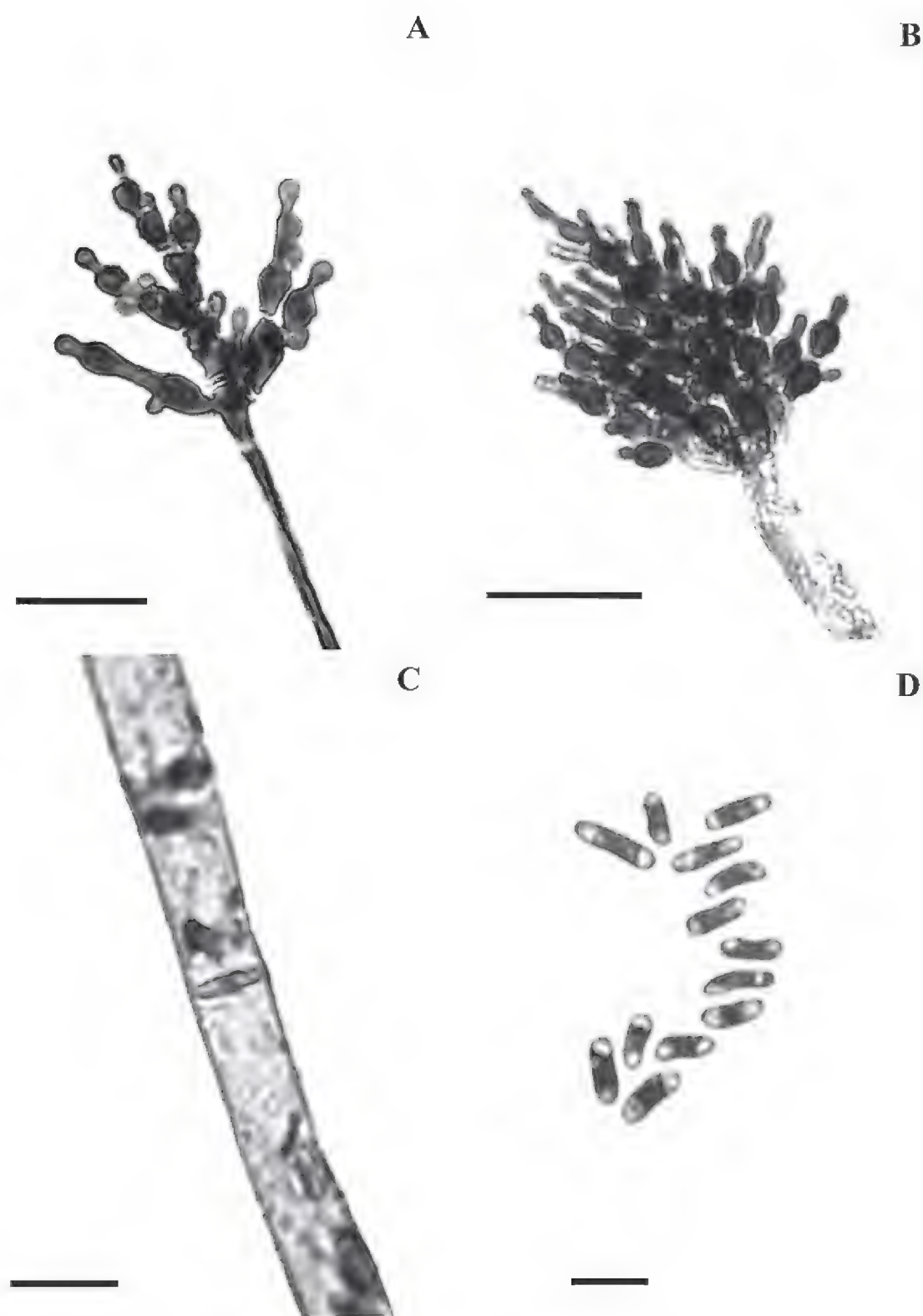


FIG 1. *Dimargaris bacillispora*
A, B. Sporophores and fertile heads in different stages of development;
C. Septum with a lenticular cavity; D. Sporangiospores.
Scale bars: A–B = 25µm; C = 10µm; D = 5µm.

and these two species should probably be placed in synonymy. Nevertheless, these two species were listed by Benny (2005) and in Species Fungorum (www.speciesfungorum.org) as being distinct.

This report describes the first occurrence of *Dimargaris* in South America, contributing to the knowledge of the geographical distribution of *Dimargaritales*. Only one taxon from this order has been reported previously in Brazil, *Dispira cornuta* isolated from herbivore dung (Viriato & Trufem 1985).

Acknowledgements

The authors thank Dr Paul Kirk and Dr Gerald L. Benny for article review, Dr Leonor Costa Maia for reading the manuscript and giving valuable suggestions, Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (CAPES) for a PhD Scholarship provided to the first author, and Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq) for providing a research grant to the second author.

References

- Benjamin RK. 1959. The merosporangiferous *Mucorales*. *Aliso* 4: 321–433.
- Benjamin RK. 1965. Addenda to 'the merosporangiferous *Mucorales*' III. *Dimargaris*. *Aliso* 6: 1–10.
- Benny GL. 2005. *Zygomycetes*. Published on the Internet at <http://www.zygomycetes.org>.
- Boedijn KB. 1959. Notes on the *Mucorales* of Indonesia. *Sydowia* 12: 321–362.
- Kirk PM, Kirk JP. 1984. *Dimargaris*, a genus new to the British Isles. *Trans. Brit. Mycol. Soc.* 82: 551–553.
- Mehrotra BS, Baijal U. 1963. A new species of *Dimargaris* from India. *Can. J. Bot.* 41: 499–502.
- Mehrotra BS, Baijal U. 1964. *Dimargaris verticillata* Benjamin var. *xerosporica* var. nov. and *Dimargaris simplex* sp. nov. from India. *Zentralbl. Bakteriол. Hyg. 2 Abt.* 118: 171–177.
- Mikawa T. 1976. Materials for the fungus flora of Japan (21). *Trans. Mycol. Soc. Japan* 17: 4–8.
- Mirza JH, Khan SM, Begum S, Shagufta S. 1979. *Mucorales* of Pakistan. Faisalabad, Pakistan, University of Agriculture.
- Tieghem PEL van. 1875. Nouvelles recherches sur les Mucorinées. *Ann. Sci. Nat. Bot. Sér.* 6, 1: 5–175.
- Viriato A, Trufem SFB. 1985. *Mucorales* de São Paulo. 7. Espécies Merosporangiadas. *Rickia* 12: 147–154.
- Wrzosek M, Gajowniczek Z. 1998. Some zygomycetous fungi new to Poland. *Acta Mycol.* 33: 265–27